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Inhibitory effects of quercetin and kaempferol as two propolis derived flavonoids on tyrosinase

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ABSTRACT

Tyrosinase is a copper-containing enzyme, which is widely distributed in microorganisms, animals and plants. It is also a key enzyme in melanin biosynthesis, which plays a crucial role in determining the color of mammalian skin and hair. In this work, the effects of quercetin and kaempferol as propolis-derived compounds on activity of mushroom tyrosinase (MT) were studied. These flavonoids induced inhibition on the catecholase and cresolase reactions of the enzyme with using of caffeic acid and p-comaric acid as substrates, respectively. The inhibition mode of quercetin and kaempferol were competitive towards both catecholase and cresolase activities of the enzyme. The inhibition constants (Ki) of quercetin and kaempferol were determined as 0.072 and 0.112 mM for catecholase, and 0.016 and 0.06 mM for cresolase activities, respectively. In general, quercetin and kaempferol can be used as good candidates in melanogenesis inhibition. Moreover, they should be considered as good blockers of enzyme activity in hyperpigmentation and clinical applications.

Key words: Mushroom tyrosinase; Inhibition; Quercetin; Kaempferol